



# General Motors Approach to Pollution Prevention Technologies & Innovations

**Great Lakes Regional Pollution Prevention  
Roundtable  
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# Canadian Automotive Industry

- Employment Totals Over Half A Million
- 1 in 7 jobs in Canada Manufacturing - 184,000
  - Retail - 145,000
  - Aftermarket - 225,000
- Investment by Automotive Manufacturers Over \$22 Billion in Past Decade
- Sector Produced 2.51 Million Vehicles in 2001
- 33% of Total Exports Attributable to Auto Industry



# General Motors of Canada

- GMCL is Canada's Largest Exporter
- 2001 Revenue of C\$37 Billion
- 25,000 Employees
- Canadian Headquarters in Oshawa, Ontario
- Manufacturing Facilities
  - 8 Assembly and Component Plants
  - Plus CAMI Automotive - joint venture with Suzuki
- Vehicle Dealerships and Retailing Outlets
  - Employ 32,000 People in Over 800 Locations Across Canada
- Sales of 470,079 Vehicles in Canada in 2001
  - 29.4% Market Share
- Investment in Canada of C\$6 Billion in the past decade



# General Motors

## Environmental Principles

- We are committed to actions to restore and preserve the environment.
- We are committed to reducing waste and pollutants, conserving resources and recycling materials at every stage of the product life cycle.
- We will continue to participate actively in educating the public regarding environmental conservation.
- We will continue to pursue vigorously the development and implementation of technologies for minimizing pollutant emissions.
- We will continue to work with all governmental entities for the development of technically sound and financially responsible environmental regulations.
- We will continually assess the impact of our plants and products on the environment and the communities in which we live and operate with a goal of continuous improvement.



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The Company

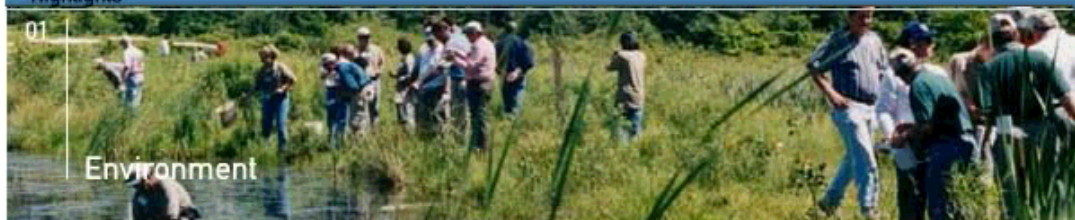
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Automotive

Beyond Automotive

## Environment

### Highlights



Environment

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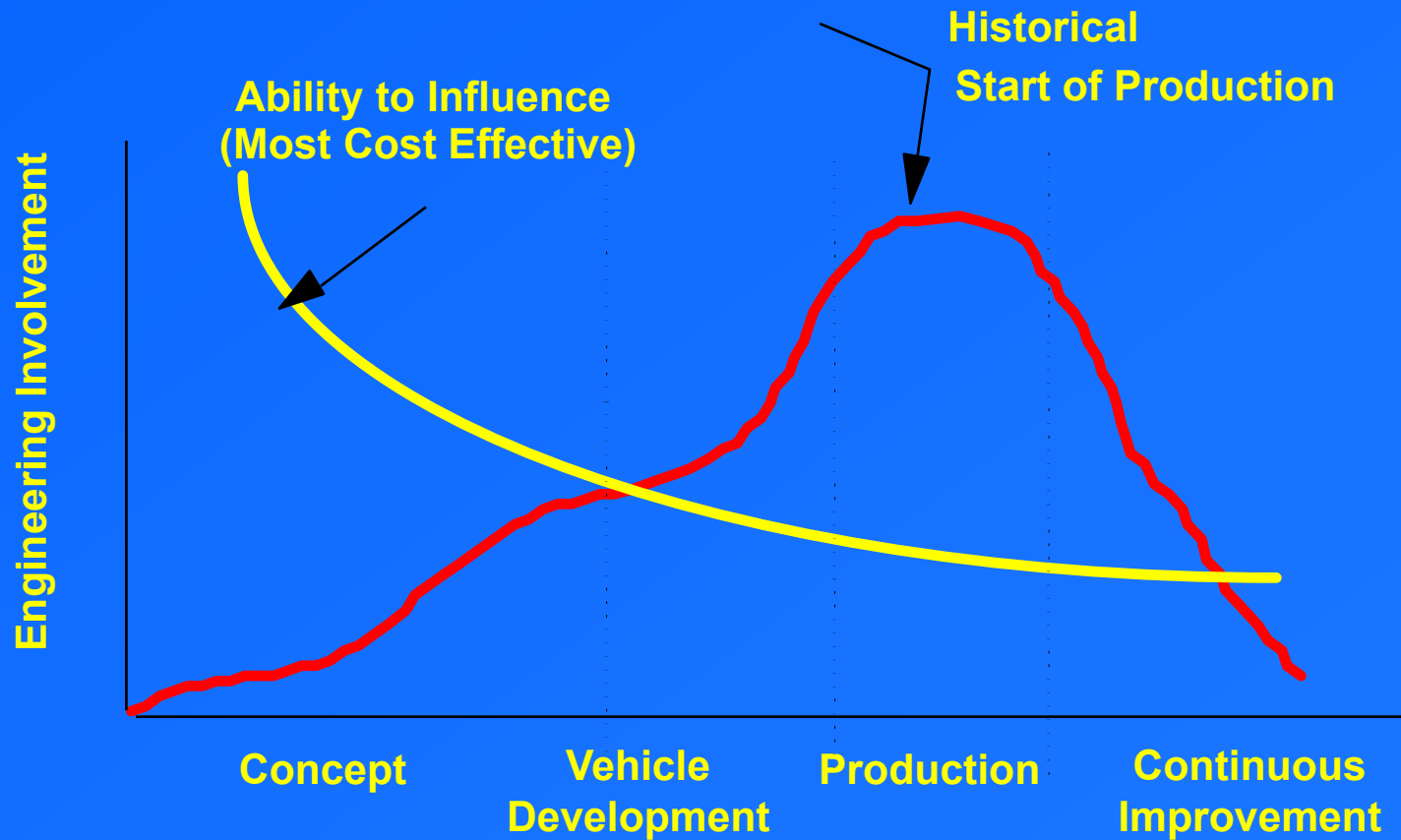


# GM Focus

- Pollution prevention principles are applied in key areas of GM
  - Product design
  - Manufacturing
  - Business partners - Suppliers / Dealers & Retailers
- Pollution prevention makes good business sense
  - best approaches are voluntary
  - coordinate process and product change with product and facility life cycles

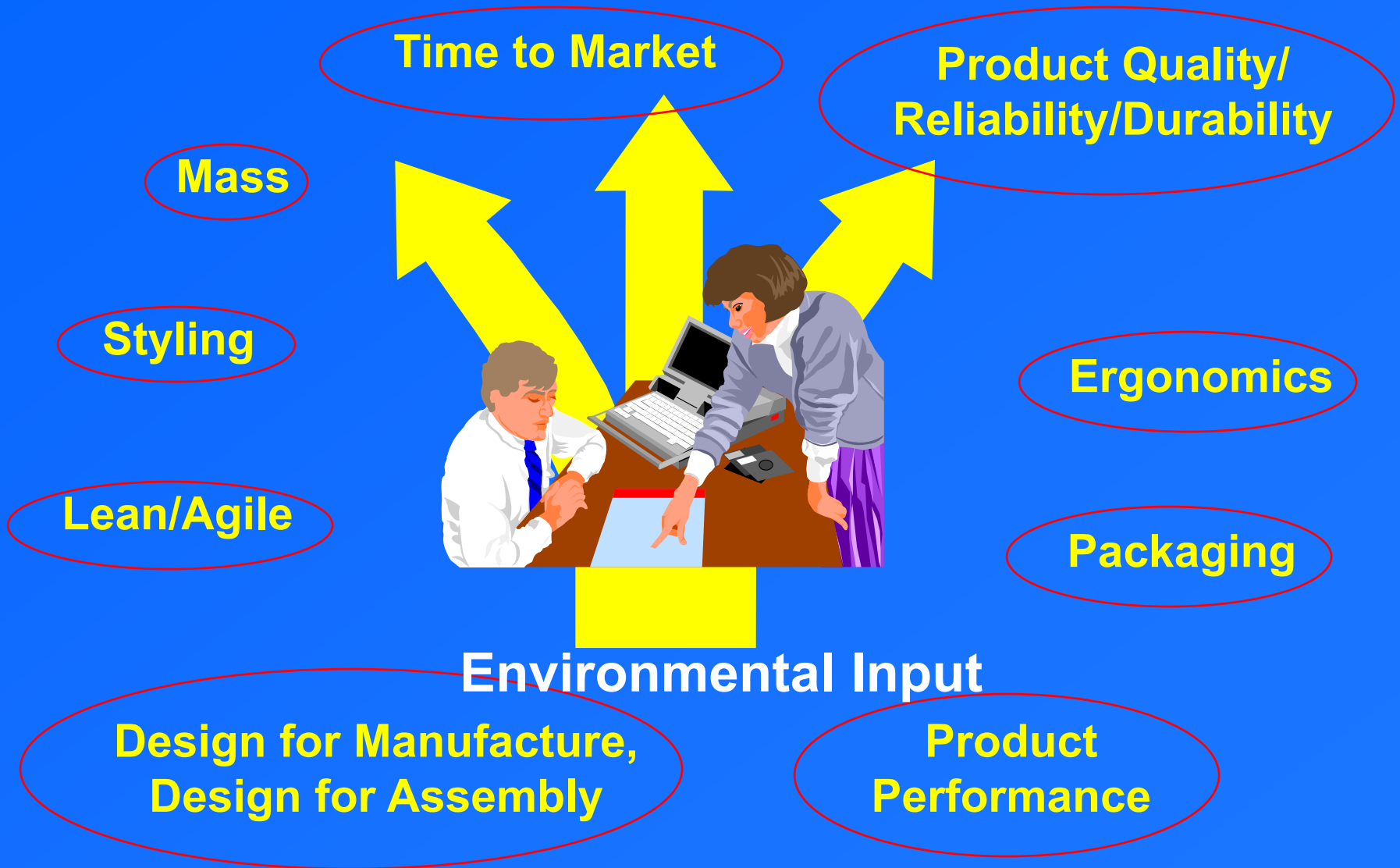


# Design For Environment





# Design For Environment







# Design For Environment

- Criteria and Tools
  - Restricted materials list
  - DFE assessment tool/worksheet to identify best processes/technologies
- Develop Environmentally Preferable Alternatives
  - Identify alternative technologies



# GM Facilities

- Voluntary Corporate Goals - Facilities
- We Care
  - Internal system to engage workforce
- Canada's Voluntary Challenge Registry
  - GHG emissions reductions of 37% since 1990
- National Pollutant Release Inventory (NPRI)
  - 32% reduction in total releases and transfers since 1995
- Great Lakes Pollution Prevention Program



# Great Lakes Pollution Prevention Program

- DaimlerChrysler, Ford and General Motors have been environmental leaders since 1992
- Partnered with Ontario Ministry of Environment and Environment Canada in the Canadian Automotive Manufacturing Pollution Prevention Project (CVMA P2 Project)
  - delivered substantial reductions and eliminations of substances through pollution prevention amounting to more than 400,000 tonnes
- Recognition
  - Ministry's Pollution Prevention Pledge Leadership Award
  - Canadian Council of Ministers of the Environment Pollution Prevention Award -- 2000



# Case Study: Truck Plant VOC Reductions - Aquabell

- Paint usage is influenced by
  - customer demand & expectations for quality and superior exterior appearance
  - size of the vehicle being painted
- Increasing transfer efficiency allows less paint to be sprayed
- Aquabell is a paint applicator that increases transfer efficiency by more than 20%
- GMCL Oshawa Truck Plant 1st facility in the world to implement Aquabell technology





# Case Study: Oshawa Car Plant

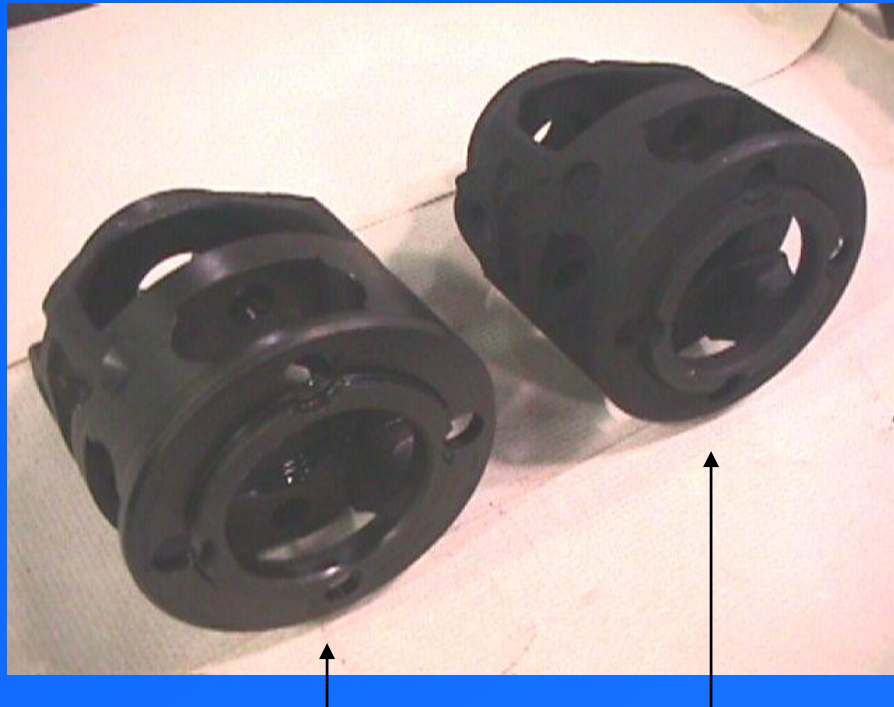
## Copper Weld Cap Reuse & Recycle

- Welding is required to meet:
  - Safety standards
  - Customer squeak & rattle demands
- Average of 2000 welds per car
- Weld Cap Statistics:
  - 98% Copper
  - Used over 900,000 weld caps in 2001
- Program results in 2001
  - 4 tonnes weld caps reused
  - 35 tonnes weld caps recycled





# Case Study: St. Catharines Components Deburring Process



After

Before

- Carrier is a housing on the final drive assembly requiring extensive machining to remove metal burrs
- Switched from a chemical to a mechanical deburring process
- Resulted in annual elimination of:
  - 100 tonnes of sodium nitrate
  - 10 tonnes of nitric acid
  - 180 tonnes sodium hydroxide
  - disposal of 1,000 tonnes of hazardous waste sludge



# The Road Ahead

## ISO 14001 Framework & P2

<u>ISO Element</u>	<u>Application to P2</u>
Environmental Policy	Each participating facility defines company's environmental policy that includes a commitment to continual improvement and prevention of pollution
Environmental Aspects	Identification of significant environmental aspects associated with facility's activities
Legal/Other Requirements	CCME OEM VOC Guidelines, local agreements, Federal P2 planning requirements, corporate policy, community concerns
Objectives & Targets	Facility-specific objectives and targets, established and reviewed regularly, based on technological options, company's financial, operational and business requirements
Environmental Mgmt Prog's	P2 projects developed with timelines and responsibilities to achieve objectives and targets, to be reviewed and updated regularly
Structure & Responsibility	Commitment of resources to P2 projects
Training/awareness/	Identification of training needs necessary for competence carrying out P2 projects
Communication	Outreach activities such as supplier workshops, site visits, presentations at conferences, annual progress reports etc.

# ISO 14001 Framework & P2

<u>ISO Element</u>	<u>Application to P2</u>
EMS Documentation	Facility's EMS manual
Document Control	Facility's document control system
Operational Control	Facility's procedures and work practises
Emergency Preparedness & Response	Facility's emergency response plans
Monitoring and Measurement	Regular monitoring and measuring of key environmental characteristics to allow for performance tracking
Non-conformance and Corrective Action	Facility's self-checking & corrective action system
Records	Facility's record retention system
EMS Audit	Facility's internal audit system and third party audits
Management Review	Regular review of progress on P2 projects





# Business Partners - Suppliers and Dealers

- Suppliers
  - ISO 14001 Certification Requirement
  - Workshops to identify and eliminate all types of waste in facilities
  - Recyclability / Recoverability Design Guidance
- Dealers
  - Dealership Waste Management Guide
  - GM programs for oil, CFCs, packaging, and equipment cores



# Pollution Prevention at GMCL

- A Strong Commitment Backed by Action
- Built Into Our Processes
- Generating Solid Results
- An Ongoing Journey



*General Motors of Canada*